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Electric Drive Transportation Association Washington, DC

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APRIL 2011

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
02 APR 2011	**N/A**	**-**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Electric Drive Transportation Association	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
William Harris	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
US Army RDECOM-TARDEC 6501 E 11 Mile Rd Warren, MI 48397-5000, USA	**20770RC**
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
US Army RDECOM-TARDEC 6501 E 11 Mile Rd Warren, MI 48397-5000, USA	**TACOM/TARDEC/RDECOM**
	11. SPONSOR/MONITOR'S REPORT NUMBER(S) **21770RC**

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release, distribution unlimited

13. SUPPLEMENTARY NOTES
Prestented Electric Drive Transportation Association, Washington DC, USA, 11 April 2011, The original document contains color images.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**SAR**	**8**	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std Z39-18

TARDEC Mission

- **Provides full life-cycle engineering support and is provider-of-first-choice for all DOD ground combat and combat support vehicle systems.**
- **Develops and integrates the right technology solutions to improve Current Force effectiveness and provide superior capabilities for the Future Force.**

Ground Systems Integrator for the Department of Defense

Responsible for Research, Development and Engineering Support to *2,800* Army systems and many of the Army's and DOD's Top Joint Warfighter Development Programs

Chartered by Secretary of the Army 21 June 1993

Mission:

"The Center will serve as the Army focal point for the development of dual-use automotive technologies and their application to military ground vehicles. It will focus on facilitating joint efforts between industry, government and academia in basic research, collaboration, technology, industrial base development and professional development."

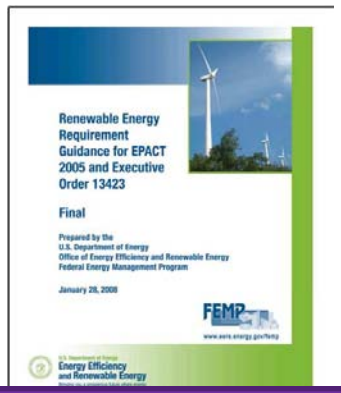
RDECOM TARDEC
NAC
NATIONAL AUTOMOTIVE CENTER

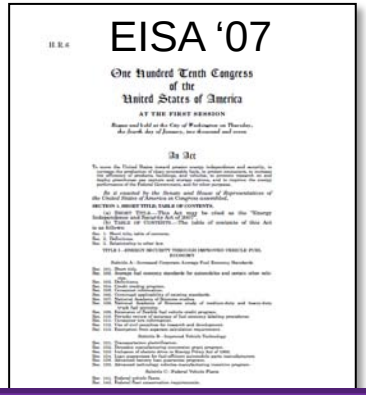
"Leveraging Opportunities to Fill Technology Gaps."

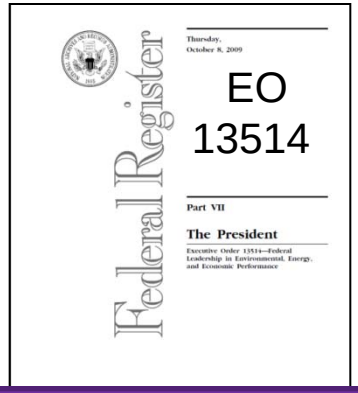
Guidance

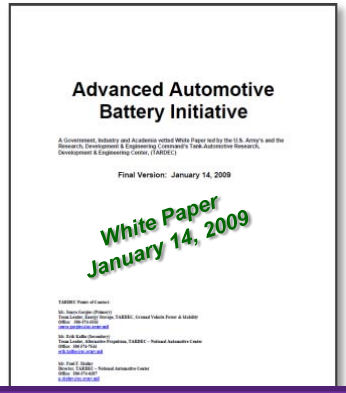
National Energy Policies and Army Energy Strategy

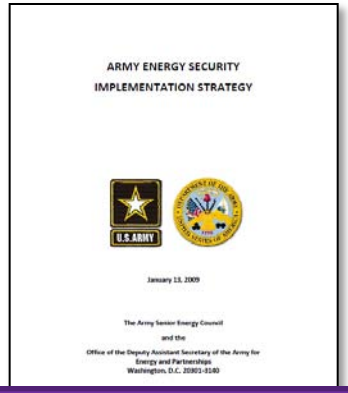
- **Federal mandate - reduce petroleum consumption**
  - **2%/year from 2005 – thru 2020**
  - **Reduce green-house-gas/other emissions**
- **Capitalizing on advanced automotive battery commercialization investment**
- **Installation & Forward Operating Base (FOB) "Net Zero" electrical power production strategy (generated = consumption)**











Meeting energy & power mandates, goals, and strategy requires understanding of the challenge

Non-tactical Vehicle Inventory: Size of the Challenge

Organization[1]	Total Vehicles[1]	Auto[1]	Trucks[1]	Other[1]	Owned[1] Leased	Advanced	Petroleum Red. % vs. 2005
Government	651,000	240,000	402,000	9500	69% 31%	<1%[2]	-1.7%[2]
DOD	195,000	86,000	102,000	6600	35% 65%	<1%	@ 9% vs. 8%
Army	83,000	44,000	36,000	2900	15% 85%	~1%	2%[3]
CONUS Army Bases	72,000	38,000	32,000	2444	15% 85%	~1%	-7%

= Not meeting Petroleum Reduction Goal

Other = Ambulances, Buses

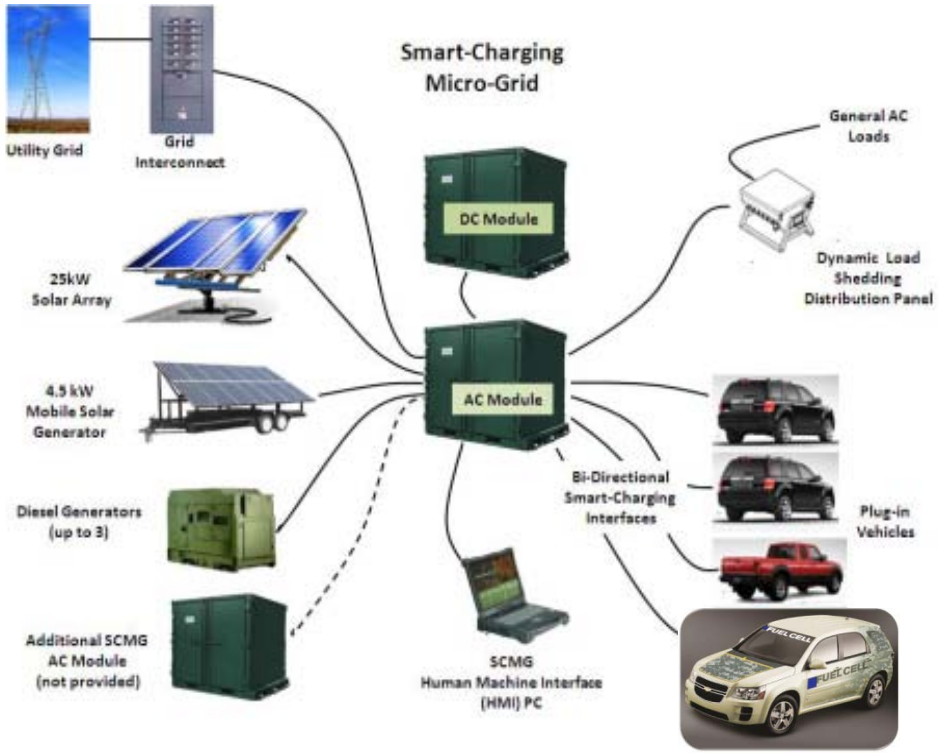
= Meeting Goal (8% as of 2009)

Typical lease is 3 to 4 years

Sustainable solution requires a phased replacement strategy

Hawaii Hydrogen Initiative

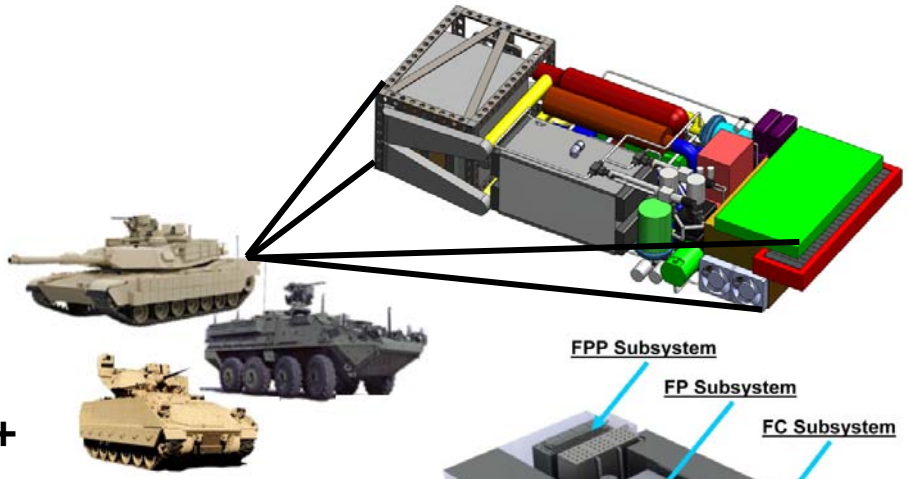
- **Tri-Service Efforts**
  - Fuel Cell End Users Forum
- **On-going Projects**
  - Smart Microgrid
  - Hydrogen Hybrid SUV Fleet
  - FCV Fleet
  - Vehicle Exportable Power
  - Hydrogen Station at Schofield
- **Existing Known Opportunities**
  - Backup FC Applications
  - Material Handling Equipment
  - Hydrogen Bus (FC/ICE)
  - Bi-directional Power Development (EV/PHEV)
  - Renewable Power for Hydrogen Station
  - Waste-to-Energy

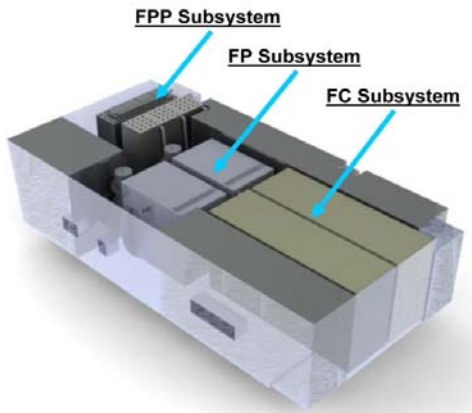


JP8 Reformer & Fuel Cell Auxiliary Power Unit (APU)

Purpose:

- Non-Primary Power using Logistics Fuel
- Quiet, continuous electrical power
- Extended engine-off operation
- Reduced acoustic and thermal signatures





- **Abrams Product:**
- **Multiple JP8 FC APUs >15 kW TRL 6+**
- **Ruggedized**
  - shock and vib; hot and cold
  - on-vehicle testing and storage testing.

- **Payoff:**
  - Auxiliary systems (engine off)
  - Increase survivability and lethality
  - Extended silent watch
  - Increase overall vehicle fuel efficiency

Challenges:

- Sulfur Tolerance
- Reliability
- Cost

- **COST**
- **Reliability**

NON-TACTICAL

- **Tri-Service Leverage**
- **Early Adopter**
- **Renewable Energy**

TACTICAL

- **Logistics Fuel Reformation**
- **Ruggedization**
- **Niche Applications**